
Tissue-Resident Macrophages Self-Maintain Locally throughout Adult Life with Minimal Contribution from Circulating Monocytes.

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Authors: Daigo Hashimoto, Andrew Chow, Clara Noizat, Pearline Teo, Mary Beth Beasley, Marylene Leboeuf, Christian D Becker, Peter See, Jeremy Price, Daniel Lucas, Melanie Greter, Arthur Mortha, Scott W Boyer, E Camilla Forsberg, Masato Tanaka, Nico van Rooijen, Adolfo Garcia-Sastre, E Richard Stanley, Florent Ginhoux, Paul S Frenette, Miriam Merad

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Public Summary:

This study established the relationship between specific immune cells.

Scientific Abstract:

Despite accumulating evidence suggesting local self-maintenance of tissue macrophages in the steady state, the dogma remains that tissue macrophages derive from monocytes. Using parabiosis and fate-mapping approaches, we confirmed that monocytes do not show significant contribution to tissue macrophages in the steady state. Similarly, we found that after depletion of lung macrophages, the majority of repopulation occurred by stochastic cellular proliferation in situ in a macrophage colony-stimulating factor (M-CSF)- and granulocyte macrophage (GM)-CSF-dependent manner but independently of interleukin-4. We also found that after bone marrow transplantation, host macrophages retained the capacity to expand when the development of donor macrophages was compromised. Expansion of host macrophages was functional and prevented the development of alveolar proteinosis in mice transplanted with GM-CSF-receptor-deficient progenitors. Collectively, these results indicate that tissue-resident macrophages and circulating monocytes should be classified as mononuclear phagocyte lineages that are independently maintained in the steady state.

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